BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant (s):	Wei-Kuo Lee et al.
Serial No.:	10/813,367
For:	CABLE SEMICONDUCTING SHIELD
Filed:	March 30, 2004
Examiner:	Nguyen, Chau N.
Group Art Unit:	2831
Confirmation No.:	4720

CERTIFICATION OF SUBMISSION

I hereby certify that, on the date shown below, this correspondence is being transmitted via the Patent Electronic Filing System (EFS) to the U.S. Patent and Trademark Office.

Date: October 16, 2006

Jere Polmatier

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sirs:

AMENDED APPEAL BRIEF UNDER 37 C.F.R. §41.37

This Amended Appeal Brief is filed to correct the deficiencies in the Appeal Brief filed May 31, 2006, which is an appeal from the final rejection of Claims 1-8 as stated in the Office Action mailed October 13, 2005. The Notice of Appeal was timely filed on March 13, 2006 along with a Pre-Appeal Brief Request for Review.

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I. REAL PARTY IN INTEREST

The real party in interest is Union Carbide Chemicals & Plastics Technology Corporation.

II. RELATED APPEALS AND INTERFERENCES

There are no related applications currently either under appeal or the subject of an interference proceeding.

III. STATUS OF CLAIMS

All the claims of this application and their individual status are reported in the Claims Appendix to this Amended Appeal Brief. Claims 1-8 are on appeal.

IV. STATUS OF AMENDMENTS

All amendments have been entered.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The claimed invention is drawn to a cable in which electrical conductors or communications media (or a core of such conductors/media) are surrounded by a layer comprising: (a) polyethylene; polypropylene; or mixtures thereof; (b) at least about 3 parts by weight carbon nanotubes; (c) at least about 10 parts by weight conductive carbon black other than carbon nanotubes; and, optionally, a copolymer of acrylonitrile and butadiene wherein the acrylonitrile is present in an amount of about 30 to about 60 percent by weight based on the weight of the copolymer or a silicone rubber. See page 2, lines 20-29. The polyethylenes are described from page 3, line 14 through page 7, line 12. Polypropylenes are described on page 7, lines 13-18. Carbon nanotubes are described from page 7, line 19 through page 8, line 10. The carbon black is described on page 8, lines 11-17. The optional component (d) is described on page 8, lines 18-24. The specified composition of the layer provides numerous advantages including lower viscosity during processing, lower absolute volume resitivity and improved thermal stability in volume resitivity.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The issue on appeal is whether or not the following final rejections are in error:

Claims 1, 4, 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delphin et al. (4,717,505) in view of Smalley et al. (6,183,714).

Claims 2, 3, 6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delphin in view of Smalley et al. as applied to claim 1 and further in view of Burns, Jr. (4,857,232).

The Examiner states that Delphin discloses a composition comprising polyethylene, at least about 3 parts by weight, based on the weight of the polyethylene, carbon fiber, and a conductive carbon black other than carbon fiber, the carbon black being present in an amount at least about 10 parts by weight, based on the weight of the polymer. The Examiner admits that Delphin does not disclose the composition comprising carbon nanotubes nor the composition used to surround the conductor. The Examiner relies on Smalley et al. for the disclosure of a composition comprising carbon nanotubes. The Examiner further states that it would have been obvious to one skilled in the art to use the composite of Delphin to surround the conductor since the composition provides both electrical and mechanical properties.

VII. ARGUMENT

The key issue on appeal is whether the evidence of unexpected results provided by the Applicants rebuts the rejection based on obviousness over a combination of the prior art. The Examiner, relying on an opinion of the Board of Patent Appeals and Interferences, that the results provided by the Applicants naturally flow from the suggestion of the prior art and cannot be the basis for patentability. The Applicants believe that the Examiner is misapplying the precedent.

More specifically, in the Response to the Office Action that was mailed May 2, 2005, the Applicants argued that the claims were not obvious due to unexpected results achieved by the claimed composition. In the Response to the Arguments in the Final Rejection, the Examiner stated that "the fact that Applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious" *See Ex Parte Obiaya,* 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). The Applicants believe that the case cited by the Examiner does not support the Examiner's conclusion. In particular, the Board's holding in *Obiaya* rests on two precedent cases, *In Re Best*, 195 USPQ 430 (CCPA 1977) and *In Re Wilder*, 166 USPQ 545 (CCPA 1970).

In Re Best, deals with a 102/103 rejection in view of newly discovered functions or properties inherently possessed by things in the prior art. *See* page 433. However, the Examiner is not arguing that the composition of the current claims is a thing in the prior art, merely that such a composition may be suggested by the prior art. Therefore, this rationale for the holding in *Obiaya* is not applicable to the current case. Moreover, the inherency rejection dealt with in *In Re Best* was to claims for a process, not to compositions as currently claimed.

The other precedent case, *In Re Wilder*, is more on point. *Wilder* deals with claims to a composition of matter. However, as stated in footnote 3 of the *Wilder* opinion,

> "It will be apparent that we are treating the instant claims, concededly drawn to compositions, as if the only important element is the anti-oxidant adjuvant and the rubber merely acts as a matrix or environment wherein the important properties of the adjuvant compound are manifested. In this respect the claims may be said to be similar to those drawn to a pharmaceutical or insecticidal compositions similarly containing only a single

> "active" ingredient. It should be apparent that this approach cannot be utilized with all claims drawn to compositions." (emphasis added)

Since the current claims are to a composition that cannot be categorized as containing only a single "active" ingredient, the rationale of *In Re Wilder*, and by extension, *Obiaya*, does not hold to the current claims.

In view of the above arguments, the Applicants request that the Panel consider the following question. An axiom of patent law is that an obviousness rejection can be rebutted by a showing of unexpected results. However, under the Examiner's position, all properties of a new composition (that is rejected for obviousness) are inherent in that composition and any properties, even if unexpected, would be merely a newly discovered advantage flowing naturally from the suggestions in the prior art. Consequently, if the Examiner's argument holds, how could unexpected results ever be used to rebut an obviousness rejection?

Therefore, the Applicants believe that the prior remarks and arguments that have been presented provide evidence of unexpected results that rebut the Examiner's *prima facie* case and are not dismissible under the doctrine of *Wilder/Best/Obiaya*. As such, the Applicants maintain their previous arguments, which are summarized below.

The Applicants believe that the present invention exhibits surprising results in view of the prior art. In particular, the prior art would not lead one skilled in the art to expect the synergistic effects on melt viscosity and volume resistance achieved by using a blend of carbon nanotubes and carbon black. Also, the Applicants believe that the current invention demonstrates an unexpected long term stability in volume resitivity.

Table 1 on page 18 of the specification reports the viscosity for various compositions, and the viscosity of the Example 1 composition (all carbon black) is significantly higher at various shear rates than the viscosity of the Example 4 composition (mixture of carbon black and carbon nanotubes). The lower viscosity of Example 4 is important to a more facile processing of the composition into a semiconductor shield layer. This lower viscosity is even more striking when compared against the composition of Example 2 which contains 20 weight percent carbon

nanotubes and 0 weight percent carbon black. The viscosity of the composition of Example 2 is even greater across the various shear rates than that of the composition of Example 1.

In addition, at page 20, Table 2 of the specification, the volume resistivities of the compositions of Examples 1-4 are reported. The Examiner will note that not only is the volume resistivity of the composition of Example 4 comparable to that of the composition of Example 1, but it is much more stable over various thermal cycles than the volume resistivity of the Example 1 composition.

For the reasons stated in the above argument, Appellants believe that the claims on appeal comply with 35 U.S.C. §103(a), and they request that the final rejection of the claims on appeal be reversed.

Respectfully submitted,

Date: October 13, 2006

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VIII. CLAIMS APPENDIX

1. (original) A cable comprising one or more electrical conductors, communications media or a core, each electrical conductor, communications medium, or core being surrounded by a layer comprising:

(a) polyethylene; polypropylene; or mixtures thereof;

(b) at least about 3 parts by weight, based on the weight of component (a), carbon nanotubes;

(c) (a conductive carbon black other than carbon nanotubes, the carbon black present in an amount at least about 10 parts by weight, based on the weight of component (a); and

(d) optionally, (i) a copolymer of acrylonitrile and butadiene wherein the acrylonitrile is present in an amount of about 30 to about 60 percent by weight based on the weight of the copolymer or (ii) a silicone rubber.

2. (original) The cable defined in claim 1 wherein component (a) is a copolymer of ethylene and an unsaturated ester.

3. (original) The cable defined in claim 2 wherein the unsaturated ester of the ethylene/unsaturated ester copolymer is selected from the group consisting of vinyl esters, acrylic acid esters, and methacrylic acid esters, and wherein the unsaturated ester is present in the ethylene/unsaturated ester copolymer in an amount of about 10 to about 55 percent by weight.

4. (original) The cable defined in claim 1 wherein the layer is a semiconducting shield and component (c) is present in an amount of about 10 to about 100 parts by weight per 100 parts by weight of component (a).

5. (original) The cable defined in claim 1 wherein the layer is a semiconducting shield and, for each 100 parts of component (a), component (b) is present in an amount of about 3 to about 17 parts by weight ; component (c) is present in an amount of about 10 to about 100

parts by weight; and the weight ratio of component (b) to component (c) is about 0.1 :1 to about 10 :1.

6. (original) A cable comprising one or more electrical conductors, communications media, each electrical conductor, communications medium, or core being surrounded by a semiconducting shield layer comprising:

(a) an ethylene/unsaturated ester copolymer comprising an unsaturated ester selected from the group consisting of vinyl esters, acrylic acid esters, and methacrylic acid esters, and wherein the unsaturated ester is present in the ethylene/unsaturated ester copolymer in an amount of about 10 to about 55 percent by weight;

(b) carbon nanotubes;

(c) a conductive carbon black other than carbon nanotubes; and

(d) optionally, (i) a copolymer of acrylonitrile and butadiene wherein the acrylonitrile is present in an amount of about 30 to about 60 percent by weight based on the weight of the copolymer or (ii) a silicone rubber

with the proviso that, for each 100 parts of component (a), component (b) is present in an amount of about 3 to about 17 parts by weight ; component (c) is present in an amount of about 10 to about 80 parts by weight; and the weight ratio of component (b) to component (c) is about 0.2 :1 to about 8 :1.

7. (original) A cable comprising one or more electrical conductors, communications media, each electrical conductor, communications medium, or core being surrounded by a layer comprising:

(a) polyethylene; polypropylene; or mixtures thereof;

(b) carbon nanotubes; and

(c) a conductive carbon black other than carbon nanotubes

with the proviso that, for each 100 parts of component (a), component (b) is present in an amount of at about 3 to 17 parts by weight.

8. (original) A composition comprising:

(a) an ethylene/unsaturated ester copolymer comprising an unsaturated ester selected from the group consisting of vinyl esters, acrylic acid esters, and methacrylic acid esters, and wherein the unsaturated ester is present in the ethylene/unsaturated ester copolymer in an amount of about 10 to about 55 percent by weight;

(b) carbon nanotubes;

(c) a conductive carbon black other than carbon nanotubes; and

(d) optionally, (i) a copolymer of acrylonitrile and butadiene wherein the acrylonitrile is present in an amount of about 30 to about 60 percent by weight based on the weight of the copolymer or (ii) a silicone rubber

with the proviso that, for each 100 parts of component (a), component (b) is present in an amount of about 3 to about 17 parts by weight ; component (c) is present in an amount of about 10 to about 100 parts by weight; and the weight ratio of component (b) to component (c) is about 0.1 :1 to about 10 :1.

IX. EVIDENCE APPENDIX

None

X. RELATED PROCEEDINGS APPENDIX

None